STATE OF OHIO

FRANK J. LAUSCHE, Governor

DEPARTMENT OF NATURAL RESOURCES

A. W. MARION, Director

DIVISION OF GEOLOGICAL SURVEY

JOHN H. MELVIN, Chief

Information Circular No. 6

Division of Geological Survey

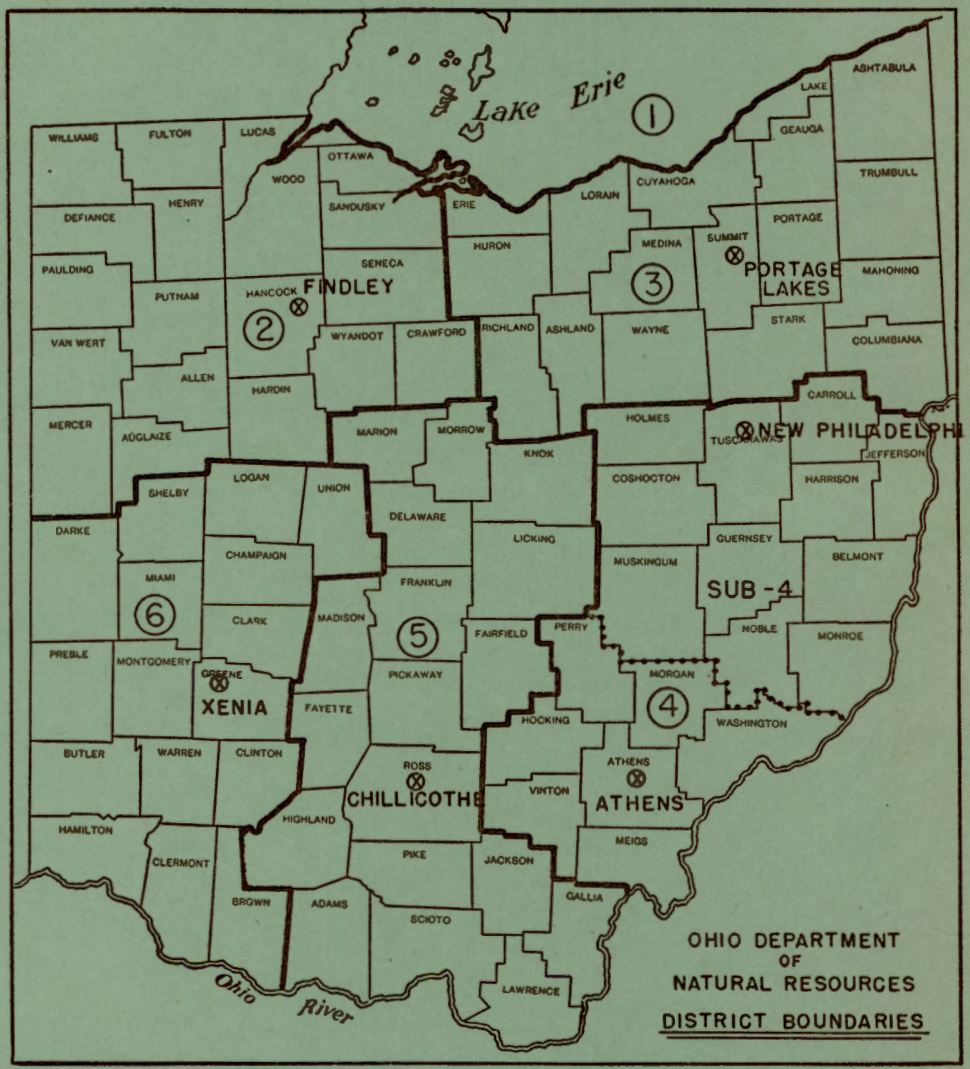
Annual Report

1950

by

JOHN H. MELVIN

Reprinted from ANNUAL REPORT of the Director
DEPARTMENT OF NATURAL RESOURCES
For the Period August 11, 1949 to June 30, 1950



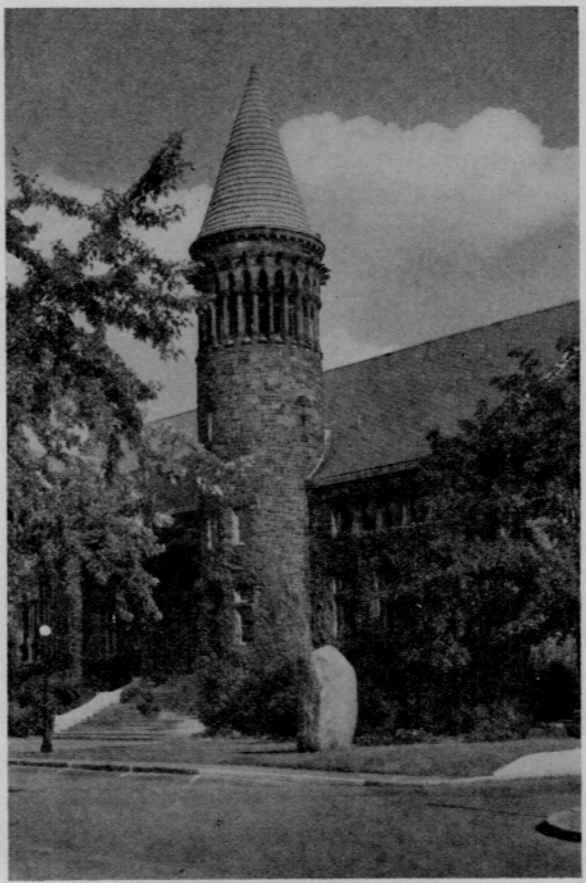
DISTRICT OFFICES

District	Location
No. 1	Fisheries Bldg., Sandusky, Ohio
No. 2	U. S. Route 25, Findlay, Ohio
No. 3	R. R. No. 5, Akron, Ohio
No. 4	172 N. Lancaster St., Athens, Ohio
No. 5	Savings Bank Bldg., Chillicothe, Ohio
No. 6	R. R. No. 3, Xenia, Ohio

ANNUAL REPORT

ACTIVITIES OF THE DIVISION OF GEOLOGICAL SURVEY

JOHN H. MELVIN, *Chief*



Orton Hall, on the Ohio State University Campus, has been the home of the Geological Survey for over half a century. Also housed in Orton Hall are the Department of Geology of the University, the Orton Memorial Library of Geology, the Geological Survey.

Orton Hall, opened in 1893, was constructed to house the Department of Geology and museum of that day. For fifty-seven years geological activity in the building has been growing by leaps and bounds, yet the total available space is the same as that of over fifty years ago. One of the most critical present day problems of the Geological Survey is its need for adequate space for modern laboratories and work rooms with which to better serve the people of Ohio.

MINERAL PRODUCTION IN OHIO

In 1948, the last year for which final statistics are available, only nine other states produced more mineral raw materials than Ohio.

Mineral Resource	Value	Ohio's Position
Coal	$142,972,000	5th
Gas	12,901,000	7th
Clay and clay products	63,269,741	1st
Limestone and dolomite	27,552,017	2nd
Lime	21,473,401	1st
Sand and gravel	15,149,848	3rd
Cement	20,496,930	7th
Oil	13,733,000	18th
Salt	5,884,343	3rd
Other minerals	4,795,720	
Total	$328,228,000	

Ohio, although only thirty-fifth in area, ranked fourth in 1947 among the states in value added by manufacture and processing, some $6.4 billion. A very large portion of the materials manufactured and processed were originally mineral raw materials. Ohio's mineral industries are truely the backbone of our state and national prosperity in normal times and of our national defense in times such as these.

Objective and Organization

The Division of Geological Survey is primarily a state agency dedicated to assisting in the industrial and cultural development of Ohio. Over 113 years ago, in 1837, W. W. Mather, then State Geologist, wrote in his first report, "The primary object with the legislature, in authorizing the Geological Survey of the State, was to develop its natural resources, with a view to their application to the economical purposes of life." The present day objective of the Survey is to discover and make known scientific data on the mineral and geological resources of Ohio. The staff serves the public by publication of reports on its findings, by letter, telephone or telegram, and by personal interview. Extensive files of physical and chemical data, many and varied publications and maps and the helpful suggestions of a staff of technically trained specialists are available to all who are interested in industrial development, public improvement and the conservation of our resources.

In 1949 the staff of the Division of Geological Survey included 12 full-time and 25 seasonal or part-time employees.

RESEARCH ACTIVITIES

WILLIAM SMITH

Chief of Coal Section

COAL

Coal accounts for over half of the state's total raw mineral production. In 1948 this production amounted to 36,104,000 tons. Over half of this tonnage was supplied by the open-pit method of mining.

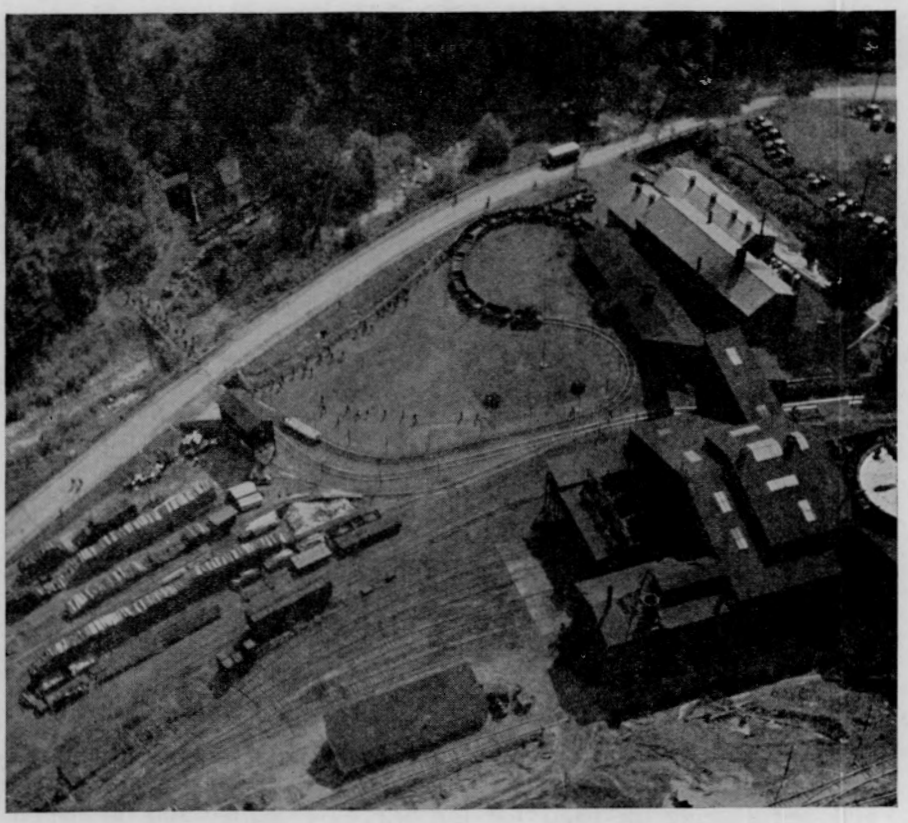
1. Accumulation of basic coal data is one of the major activities of the Coal Section. Information is obtained by measurement of outcrops and of exposures in mines, logging of drill holes, preparation of outcrop maps and analysis of samples. This information is then evaluated and interpreted in order to assist in the location of new prospecting areas and in future development of existing operations. Industry greatly assists in this work by supplying drill cores and logs, coal analyses, mine maps and samples for analysis.

2. The determination of original and remaining coal reserves is basic to industrial development. Industry must know its fuel sources for many years in advance. Such inventory studies are constantly in process based on information which has been accumulating since 1837.

3. Sooner or later liquid fuel will be manufactured from coal. If the present national emergency continues that time may not be far distant. For some time cooperative studies by the Engineering Experiment Station of the Ohio State University and the Survey have been advancing our knowledge of the properties of Ohio coals which may lend themselves to such an industry. A progress report has been prepared and will soon be published.

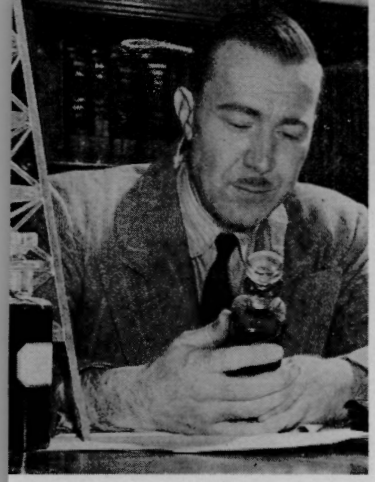
4. The beneficiation or improvement of low grade Ohio coal has been another cooperative project with the Engineering Experiment Station. The Meigs Creek, or No. 9 coal, contains very extensive unmined reserves in Ohio, and methods to improve this coal are being studied.

5. During the year special coal reports have been prepared in cooperation with the Ohio Chamber of Commerce and the Ohio Coal Association in an effort to improve the state's industrial position.



WILLOW GROVE COAL MINE, ST. CLAIRSVILLE, OHIO

An air view of the huge preparation plant at Willow Grove mine which turns out 5,000 tons of cleaned coal daily, operated by the Hanna Coal Co., Cleveland, division of the Pittsburgh Consolidation Coal Company.



R. L. ALKIRE
Chief of Oil & Gas Section

OIL AND GAS

Oil and gas production for 1948 was valued at $26,634,000. In 1949, 1,052 wells were reported drilled, of which 626 were successful and 426 resulted in dry holes; an average of 40% failures.

6. Accumulation of basic data from the oil and gas industry is progressing. In all it is estimated that over 200,000 wells have been drilled in Ohio since the early 1860's. The Survey has records of over 25,000 and with the cooperation of industry and the United States Geological Survey, is continually adding to its files. Such basic data is of use to the entire industry in the extension of existing oil fields, the discovery of new areas and the secondary recovery of oil and gas. It is also of great value in studying other underground mineral resources such as salt, brine, clay, stone, coal and gypsum.

7. The Survey prepares an Annual Report of drilling activity in Ohio which indicates the new oil and gas which has been discovered during the year. Such information is invaluable in computing the reserves of these fuels remaining underground.

8. Another activity of the oil and gas section is the collection, cataloging and study of the actual cuttings from selected wells. Much of our knowledge of the subsurface geology of Ohio is based on such studies.

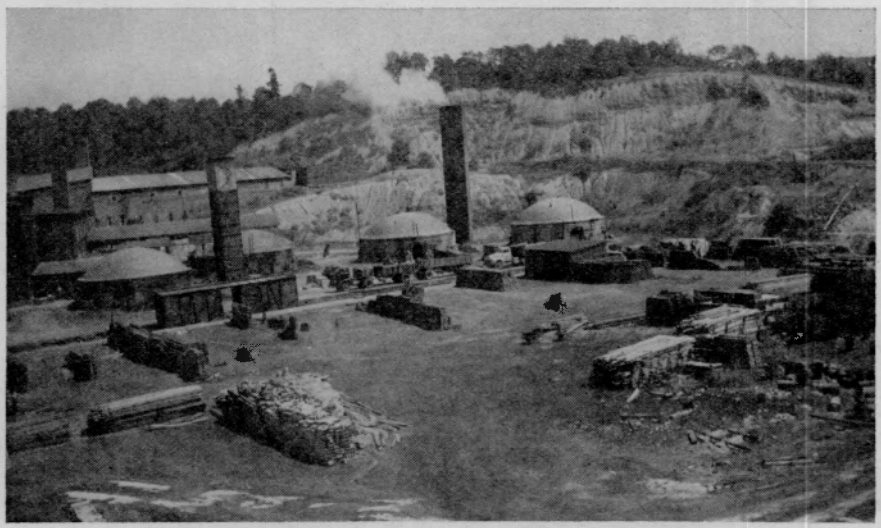
9. Oil and gas pipelines crisscross the state in a complicated network. During the past year the Survey compiled and published an oil and gas pipeline map of the state on a scale of 6 miles to the inch.

10. Special oil and gas reports were prepared in cooperation with the Ohio Chamber of Commerce. A report and maps on oil and gas development in Perry County was completed and is being published.

CLAY AND CLAY PRODUCTS

Ohio has long been a leader in the production of clay and clay products. During 1949 total production amounted to $63,269,741.

11. A study of the geological needs of the clay industries was completed and plans made for future field and laboratory studies.



View of typical Ohio clay plant and pit.

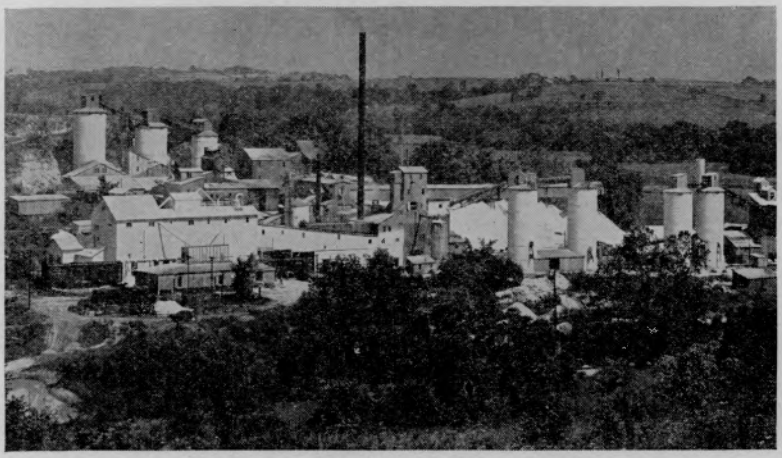
ROCK AND ROCK PRODUCTS

The value of rock and rock products produced in Ohio in 1948 amounted to more than 89 million dollars. Limestone and dolomite were used in metallurgical fluxstone, glass making, chemicals, refractories, agricultural limestone, crushed stone for highways, railroad ballast and construction purposes. Ohio led all the states in the production of lime and was seventh in cement manufacture. Sandstone and conglomerate were used in glassmaking, refractories, whetstones, building material and foundry sand. Sand and gravel production was over 15 million dollars and was exceeded by only California and Illinois.

12. The limestone of eastern Ohio have been the subject of study for a number of years. A report has been written which will soon be published in bulletin form.

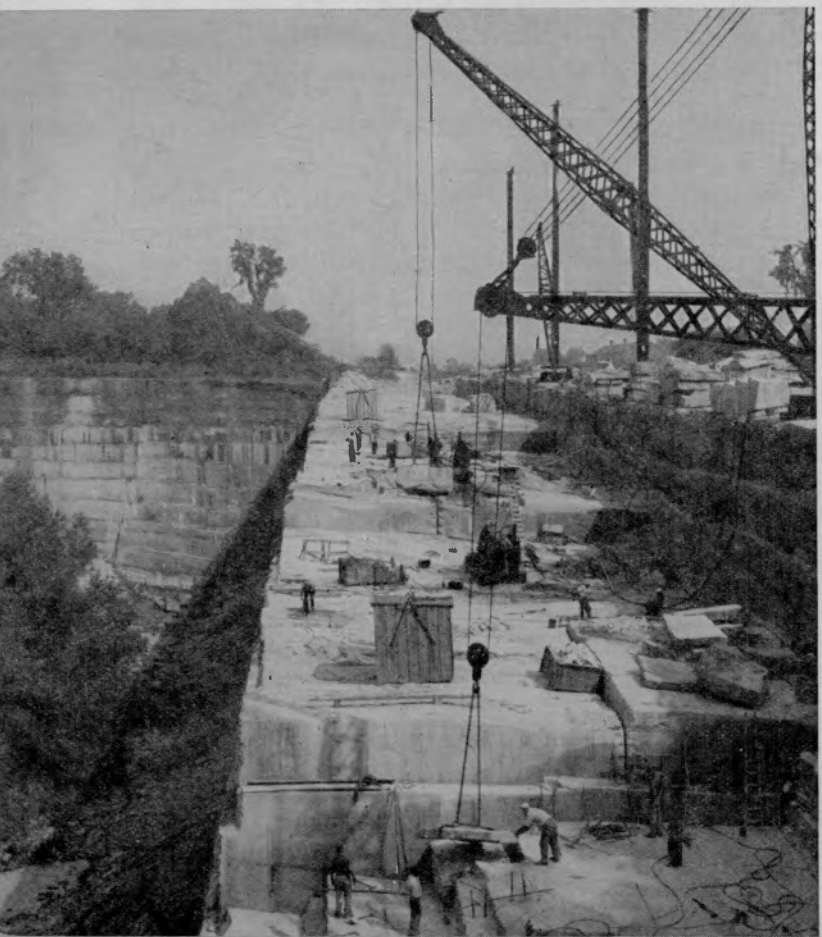
13. The jointing or fracture of the limestones of western Ohio has been studied and a report is in preparation.

14. The Sharon conglomerate formation is an important source of industrial silica. Studies are continuing on the origin and geologic occurence of this important resource.



View of an Ohio glass sand plant.

Quarry in Berea sandstone at South Amherst. Ohio produces more building sandstone than any other state.



15. A reconnaissance study of sand and gravel in northern Ohio was completed and a report published.

SALT AND BRINE

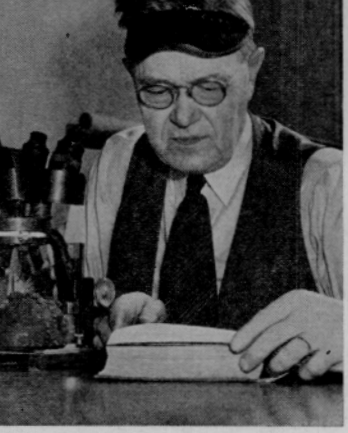
Only two states produce more salt than Ohio. Salt is derived from two sources: from brine, which is sea water modified during long burial in the rocks, and from beds of rock salt. The production figures do not distinguish between the two sources. Early salt production in Ohio was from natural brines, and these still supply a part of the production. The larger production now comes from deeply buried beds of rock salt which are mined by dissolving the salt in water pumped into the deposits, the salt being recovered from solution or the solution used directly in chemical manufacture.

Salt in natural or artificial brines is the basis of a great chemical indutsry producing soda ash, sal soda, caustic soda, sodium bicarbonate, sodium sulfate, chlorine, hydrochloric acid, and many other chemicals, most of which are in turn used as basic materials for further elaboration. Salt and limestone are the foundation rocks of of Ohio's great chemical industry.

16. During the past year the Survey has continued to collect and analyze brine samples from various parts of the state. Industry has been very cooperative in assisting with this work.

17. The Survey has been following closely exploratory efforts to locate a thick deposit of rock salt in northeastern Ohio. If suitable beds are located by core boring, it is possible that Ohio may one day have a salt mine similar to those of Michigan and New York.

Aerial view of quarry, crushing plant and refractory plant of a large producer of dead burned dolomite in Northwestern Ohio.



R. E. LAMBORN, *Asst. Chief*

BASIC SCIENTIFIC STUDIES

Fundamental geologic research must be carried on if new facts are to be accumulated. This constant stream of new scientific data forms the basis for practical application of knowledge.

18. For many years a long-range project of the Survey has been the preparation of a modern geologic map and bulletin for each of the state's 88 counties. During the past year work has been done on the following:

Adams	Monroe
Athens	Morgan
Coshocton	Perry
Gallia	Stark
Hocking	Tuscarawas
Lucas	Washington

Such studies include work on coal, clay, limestone, sandstone, sand, gravel and other mineral raw materials. Primarily because of limited funds this work has progressed slowly.

19. Editorial work is progressing on a voluminous report on the Monongahela formation of Ohio.

20. Progress is also being made on a similar report on the Mississippian formations of the state.

21. Some basic work on Lake Erie and environs has been done in the past but much more needs to be done. During the past year studies in cooperation with the Division of Beach Erosion and the Division of Water have been undertaken. Several preliminary papers are in process.

22. A knowledge of the rocks buried deeply underground can only be gained by long continued studies of the cuttings or chips from oil, gas and water wells and from core borings. A comprehensive plan for such studies was put into effect during the past year and work will continue in this field.

ETHEL S. DEAN

Public Service Section

PUBLIC SERVICE

23. The Geological Survey is a public information bureau in matters relating to mineral resources and earth science. Approximately one-third of the time of the entire staff is spent in answering inquiries by letter, telephone and personal conference. The Survey is always ready to assist in the development and conservation of mineral resources and to serve the citizens of the state.

24. The Survey published a Geography of Ohio in 1923. It was well received and the printing has been exhausted for some time. A completely new and revised Geography bulletin is now being prepared.

25. The Division has contributed new chapters on the mineral industries to the second edition of the "Empire Book" which will soon be available.

26. A special series of reports on selected mineral industries of the state has been prepared for, and distributed by, the Ohio Chamber of Commerce.

27. In cooperation with the Ohio Development and Publicity Commission and the Archaeological and Historical Museum, a comprehensive exhibit on the state's salt industry was presented at the Ohio State Fair in 1949. Other units have been prepared for exhibition on the Ohio State University campus.

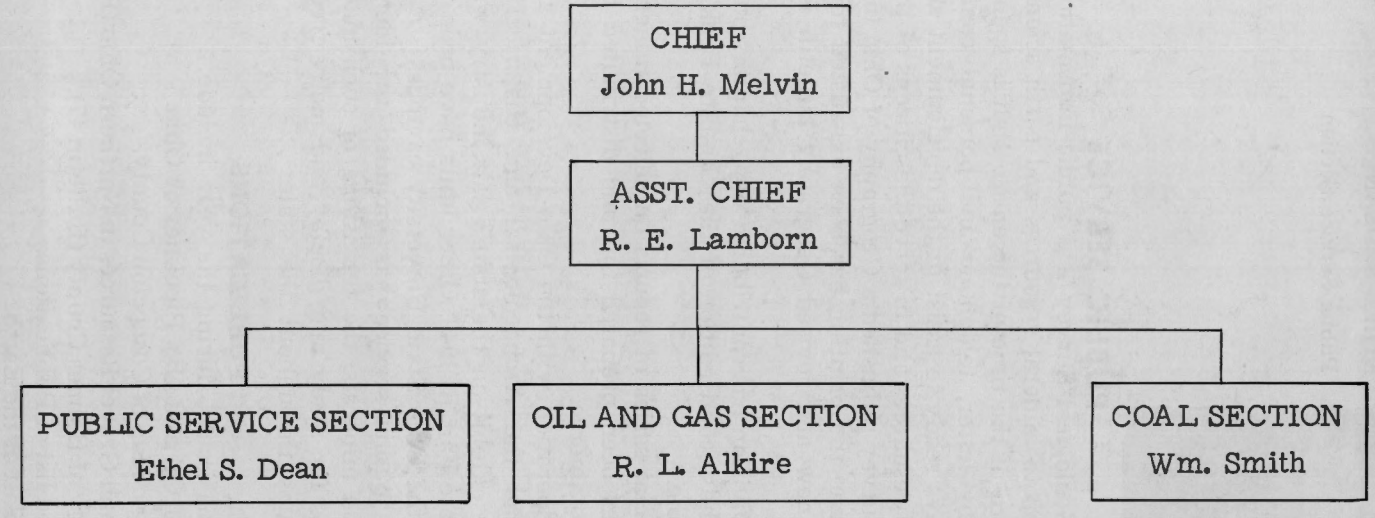
28. Other public service has included the identification of many rocks and minerals, the furnishing of such materials to interested groups for study and display and many free lectures to organized groups throughout the state.

PUBLICATIONS

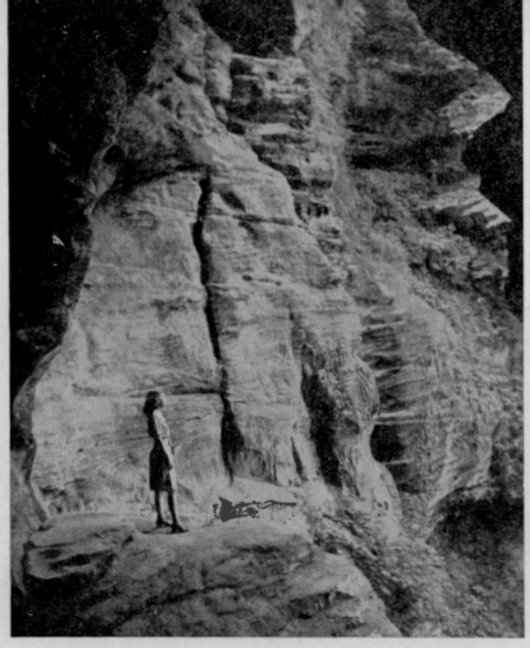
Publications issued during the year include:

Map of Oil and Gas Pipelines of Ohio.
Geologic Map of Coshocton County.
Sand and Gravel Resources in Northern Ohio (R. I. No. 5).
Geology of Holmes County (Bulletin 47).
Revised list of Publications.
Ohio, Salt of the Earth.

DIVISION OF GEOLOGICAL SURVEY



Organization - June 30, 1950



Interesting geological formation characterizes Hocking State Park.

FINANCIAL STATEMENT

The following is a statement of funds available and expenditures for the fiscal year beginning July 1, 1949 and ending June 30, 1950.

HB 654	Funds Available	Expenditures	Unemcumbered Balance
A-1 Salaries	$41,131.26	$40,807.93	$ 323.33
A-2 Wages	4,488.78	4,474.34	14.44
C-4 Office	375.00	370.35	4.65
C-4a Postage	500.00	500.00	----
E-1 Equipment	800.00	762.13	37.87
E-9 Tools & Mach.	200.00	11.31	188.69
F-1a Other Repairs	100.00	78.75	21.25
F-5 Express	50.00	44.81	5.19
F-6 Travel	5,000.00	4,997.62	2.38
F-7 Communication	180.00	150.00	29.35
F-8 Publications	7,525.00	4,499.23	3,025.77
F-9 Other	2,061.00	2,051.75	9.25
F-9a Oil & Gas Log	3,000.00	2,983.93	16.07
	$65,411.04	$61,732.80	$ 3,678.24
HB 655			
E-1 Equipment	$ 3,121.89	$ 3,112.48	$ 9.41
E-6 Motor Vehicle	2,800.00	2,545.53	254.47
E-9 Tools and Machinery	3,028.11	2,992.50	35.61
	$ 8,950.00	$ 8,650.51	$ 299.49

GEOLOGICAL SURVEY INCOME

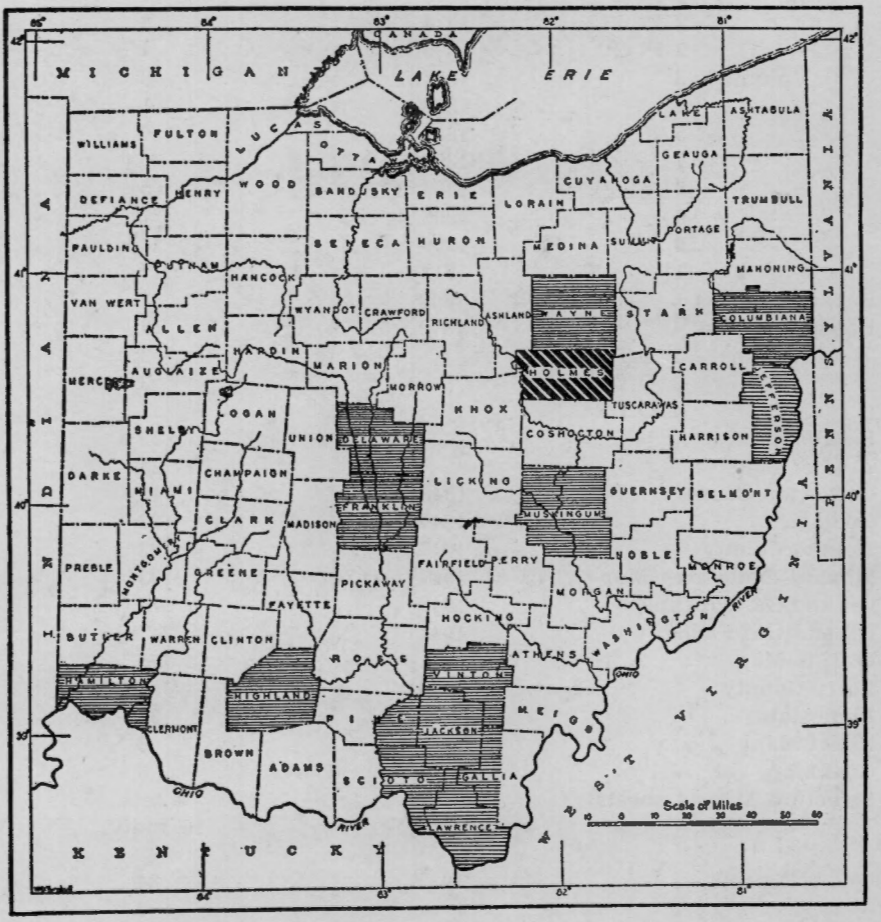
Scientific facts are never out of date. During 1949 requests were received for old as well as modern reports. Following is a tabulation of orders filled between July 1, 1949 and June 30, 1950.

Item Issued	Date Published	Number Sold
Bulletin 1	1903	16
2	1904	2
3	1904	1
6	1906	11
7	1905	11
8	1906	9
9	1908	18
10	1909	47
11	1910	4
12	1910	11
13	1910	16
14	1911	75
16	1912	9
17	1912	16
18	1915	11
19	1916	31
20	1916	6
21	1918	15
22	1920	12
23	1921	8
24	1921	17
25	1922	13
26	1923	14
28	1924	19
30	1926	9
31	1927	18
32	1928	28
34	1929	32
35	1930	10
36	1931	5
37	1932	17
38	1936	12
39	1939	18
40	1940	4
41	1940	8
42	1941	30
43	1942	12
44	1943	37
45	1944	14
46	1945	18
47	1949	46

Continued . . . . . .

1 Pt 2	1873	4
2 Pt 1	1874	8
2 Pt 2	1875	4
Volume 3	1878	8
4	1882	1
5	1884	6
7	1893	5
8	1904	5
9	1906	7
10	1909	1
11	1912	17
Report Progress	1869	3
Report Progress	1870	3
Volume 2 O.T.S.		2
3 O.T.S.		3
4 O.T.S.		1
Base Maps		52
C. & C. Map		23
Coshocton County	1948	45
Geologic	1947	177
Holmes County	1947	22
Mineral Industries Map	1947	103
Oil and Gas Pipeline	1949	219
Oil and Gas Fields	1948	247
O. T. S. Map		1
Perry County	1948	52
Photostats		32
Relief Map		3
Coal Map, Vol. VII		6
Structure Map (4 sheets)		4 sets 16 Indiv.
Reprint 1	1939	34
2		6
3	1946	54
Topographic Map		454
Vol. IX Maps		1
Vol. 1 Maps		6
2 Maps		5
U. S. G. S. Maps		4

Only actual printing cost is charged for publications. Total income from such sales was $1,809.85 for the period July 1, 1949 to June 30, 1950.



Map of Ohio showing, by shading, counties for which modern published bulletins and geologic maps are available. Unshaded areas indicate vast amount of work remaining to be done.